This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problems Mailbox.

THIS PAGE BLANK (USPTO)

RECEIVE COPY.

PATENT SPECIFICATION

DRAWINGS ATTACHED

1,058,956

1,058,956

Date of Application and filing Complete Specification: Aug. 13, 1965.
No. 34758/65.
Application made in Germany (No. T26868 XI/81e) on Aug. 22, 1964.
Complete Specification Published: Feb. 15, 1967.
© Crown Copyright 1967.

Index at acceptance:—B8 A(1F4, 1H7, 24)
Int. Cl.:—B 65 g

COMPLETE SPECIFICATION

Device for Producing a Uniform Conveying Flow of Flat items

We, TELEFUNKEN PATENTVERWERTUNGS-GESELLSCHAFT M.B.H. of 3 Elisabethenstrasse, Ulm/Donau, West Germany, a German Body Corporate, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed to the particularly described in and by the following statement:—

The invention relates to the mechanized processing of flat items such as items of mail. It relates to a device which renders it possible to establish as uniform a conveying flow as possible, with a uniform direction of overlap, from random items of this kind which arrive sometimes in piles. The uniform direction of overlap is particularly important if the items are to be supplied to a stacker or intermediate stacker, because items which are wrongly overlapped frequently cause disturbances.

The device according to the invention uses two conveying means opposite one another at each side of a conveying channel. It avoids disadvantages and imperfections of known apparatus by the combination of the features that said conveying means are situated opposite one another along a conveying path which is longer than about the length of one item of mail, and that both conveying means are driven in the conveying direction but with different conveying speeds. The ratio of the speeds of the opposite conveying means amounts preferably to between about 1:2 and 1:13.

Various possible embodiments and further advantageous features of the invention will be explained with reference to the accompanying drawings. Figures 1 to 3 show, in plan view, different embodiments in which the conveying means are formed by a group of conveyor rollers following one another in the conveying direction. Figure 4 is a section through the device of Figure 3 on the line IV—IV. Figures 5 and 6 show respectively in plan view and in section on the line VI—VI, an embodiment with conveyor rollers and a conveyor belt. Figures 7 and 8 show respectively in plan view and in section on the line VIII—VIII, an embodiment with two lateral conveyor belts.

The device shown in Figure 1 comprises a bottom conveyor belt 1 which runs over two pulleys 2 and 3, of which the latter is driven in the direction of the arrow. Mounted at each side of the conveying channel is a group of conveyor rollers 4 to 8 and 9 to 12, in such a manner that the spacing between the rollers on opposite sides of the channel becomes less from the inlet of the device situated at the left towards the exit. The rollers 4 to 8 are driven in the conveying direction at a speed of 2.5 metres per second for example, and the rollers 9 to 12 are likewise driven in the conveying direction, at a speed of 0.5 metres per second for example. Thus the ratio of the speeds amounts to about 1:5. The driving speed of the bottom conveyor belt 1 may, for example, be 2.5 metres per second or somewhat less. Guide plates or guide fences 13 and 14 are mounted at each side of the conveying channel.

When flat items are introduced on edge at random into this device from the left, which items wholly or partially overlap, then a mutual displacement of the items occurs during the travel between the two conveying means—here constructed in the form of groups of conveyor rollers 4 to 8 and 9 to 12—in such a manner that a substantially even conveying flow with a uniform direction of overlap of the items is present at the exit.

The space between the rollers 4 to 8 and 9 to 12 at the left and right is selected or adjusted according to the thickness of the items to be expected. It is advisable to provide the rollers with a resilient covering, for

example sponge rubber, particularly with a rigid arrangement of the roller shafts.

The device shown in Figure 2 differs from that in Figure 1 in that the rollers 9 to 12 are not rigidly mounted but on an arm 16 which is pivotable about a pivot pin 15. A tension spring 17 acts on an angled extension of the arm, by means of which spring the arm is pivoted so far inwards that the extension bears against a stop 18. From this position of rest, the arm 16, with the rollers 9 to 12 carried thereby, can yield outwards—as illustrated—if a large pile of items should enter the device.

Figure 2 also illustrates one possibility for the drive of the rollers. In the left-hand group of rollers, the shaft of the conveyor roller 8 is driven and a belt 20, which is guided by guide pulleys 19, transmits this drive to the other conveyor rollers 4 to 7. The rollers 9 to 12, which are mounted on the pivotal arm 16, are driven by a belt 22, guided by guide pulleys 21, from a pulley 23, which is mounted on the driven shaft 15. The drive of the rollers in Figures 1 and 3 or 4 may be effected in a similar manner.

In the device shown in Figures 3 and 4, the rollers 4′ to 8′ and 9′ to 12′ are arranged in a similar manner to the corresponding rollers in Figure 1. Two bottom belts 24 and 25 are provided, however, which follow one another in the conveying direction and of which the second has a higher conveying speed than the first. These belts run in known manner over pulleys 26, 27 and 28, 29. A base plate, not illustrated in Figure 3, is designated by 30.

In a further development of the invention, the rollers of the two groups of conveying rollers in the device shown in Figure 3 are driven in such a manner that their speeds increase from the entrance to the exit of the device. For example, the faster rollers 4′ to 8′ may have conveying speeds of 1.0 to 2.5 metres per second, while the slower rollers 9′ to 12′ may have speeds of 0.2 to 0.5 metres per second. As a result of this staggering of the speeds, the action of separating the items of mail can be increased.

In the example shown in Figure 5, one of the two conveying means mounted at the side of the conveying channel is formed by a group of conveyor rollers 31 to 34, and the other by an edgewise conveyor belt 37 running round two pulleys 35 and 36. The rollers run quickly and the belt slowly but a reverse speed distribution would also be possible. In this device, too, it would be possible, to allow the speeds of the rollers 31 to 34 to increase from the entrance to the exit as in Figure 3.

Figure 6 shows that the conveyor rollers each consist, in an advantageous manner, of two discs mounted one above the other. It is further an advantage if the first of the conveyor rollers 31 and preferably also the last roller 34 is offset in relation to the guide pulleys 35 and 36 for the edgewise conveyor belt 37, as illustrated.

In the example illustrated in Figures 7 and 8, both conveying means are realised by means of edgewise conveyor belts, one of which runs quickly and the other slowly. Conveyor belts 40′ and 40″, which run round two guide pulleys 38 and 39, are mounted at the left hand side of the conveyor channel, one above the other with a space between them. The conveyor belt 37′, which is at the righthand side of the conveying channel, is mounted precisely at the height of this interspace. This formation has proved an advantage with regard to the mode of operation aimed at. Furthermore, the belts 40′ and 40″ are provided with a surface having a greater entrainment capacity than the belt 37′. This greater entrainment capacity may, for example, be achieved by means of an appropriate covering. A belt provided with a nap has proved particularly favourable. The belts 40′ and 40″ are driven fast, the belt 37′ slowly.

In general, it has proved an advantage to provide the conveying means which runs fast with a surface having a greater entrainment capacity than the one running slowly. This applied not only to the embodiment with edgewise conveyor belts but also to those with conveyor rollers.

WHAT WE CLAIM IS:—

1. A device for producing a uniform conveying flow with a uniform direction of overlap from flat items which arrive at random in an edgewise conveyor trough system, such as items of mail in particular, comprising two conveyor means situated opposite one another, one at each side of the conveying channel, characterised in that these conveying means are opposite one another along a conveying path which is longer than about the length of one item, and that both conveying means are driven in the direction of conveying but with different conveying speeds.

2. A device as claimed in Claim 1, characterised in that the ratio between the speeds of the conveying means situated opposite one another is between 1:2 and 1:13.

3. A device as claimed in Claim 1 or 2, characterised in that each of the two conveying means is formed by a group of conveying rollers, following one another in the conveying direction.

4. A device as claimed in Claim 3, characterised in that the two groups of conveyor rollers are mounted for movement in relation to one another.

5. A device as claimed in Claim 4, characterised in that one of the two groups of conveyor rollers is mounted on a pivotal arm, the pivot of which is in the vicinity of the exit from the conveyor of the device and which

can be swung outwards from a position of rest against the force of a spring.

6. A device as claimed in Claim 1 or 2, characterised in that one of the two conveying means is formed by a group of conveyor rollers following one another in the conveying direction, and the other is formed by an edge wise conveyor belt.

7. A device as claimed in Claim 6, characterised in that, at the entrance, the first of the conveyor rollers is offset in the conveying direction in relation to a guide pulley of the conveyor belt.

8. A device as claimed in any one of the claims 3 to 7, characterised in that the speeds of the conveyor rollers increase from the entrance towards the exit from the device.

9. A device as claimed in any one of claims 3 to 5, characterised in that the conveying channel is provided with a bottom conveyor belt in addition to the two groups of conveyor rollers arranged laterally.

10. A device as claimed in any one of the Claims 1 to 9, characterised in that the conveying channel is provided with two bottom conveyor belts in addition to the two conveying means arranged laterally, which bottom conveyor belts follow one another in the conveying direction and the second one has a higher conveying speed than the first.

11. A device as claimed in Claim 1 or 2, characterised in that the two conveying means are edgewise conveyor belts.

12. A device as claimed in Claim 11, characterised in that two or more conveyor belts (40′, 40″) are mounted one above the other with spaces between them at least at one side of the conveying channel, and that the conveyor belt or conveyor belts at the other side of the conveying channel are mounted at the height of these interspaces.

13. A device as claimed in any one of Claims 1 to 12, characterised in that one of the two conveying means is provided with a surface having a greater entrainment capacity than the other, and the conveying means having the greater entrainment capacity in each case has the higher speed.

14. A device for producing a uniform conveying flow of flat items arriving at random substantially as described herein with reference to and as illustrated in Figure 1, Figure 2 Figures 3 and 4, Figures 5 and 6, or Figures 7 and 8 of the accompanying drawings.

K. RODAN & CO.
Chartered Patent Agents
Beacon House, 113 Kingsway,
London, W.C.2.

Leamington Spa: Printed for Her Majesty's Stationery Office by the Courier Press.—1967.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

1053956 COMPLETE SPECIFICATION
4 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheets 1 & 2

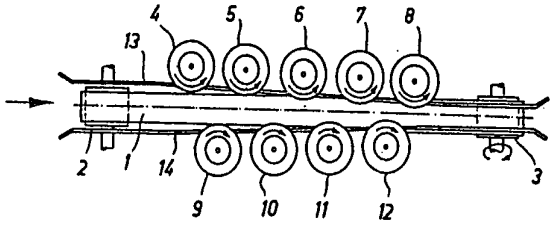

Fig. 1

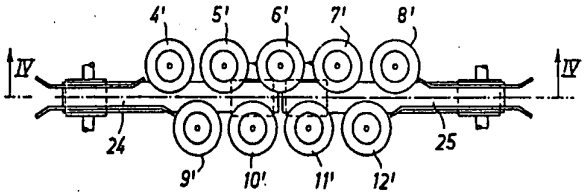

Fig. 3

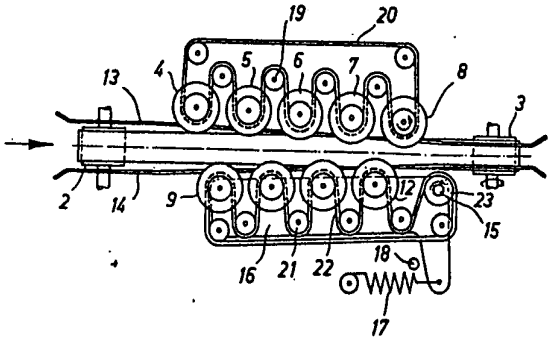

Fig. 2

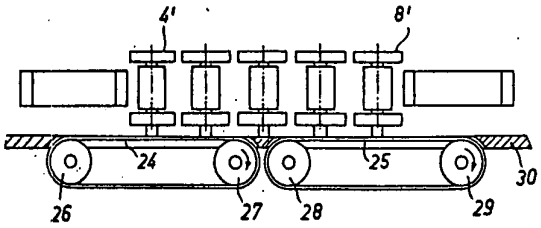

Fig. 4

1058956 COMPLETE SPECIFICATION
4 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheets 3 & 4

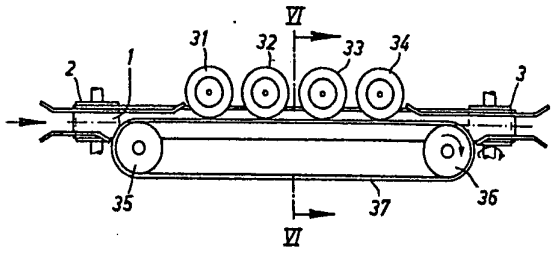

Fig. 5

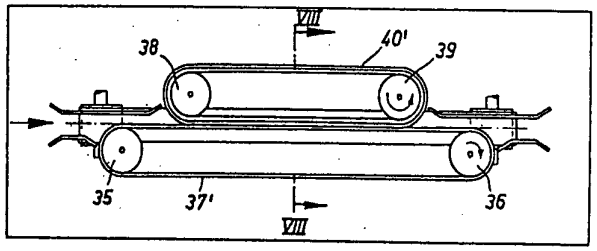

Fig. 7

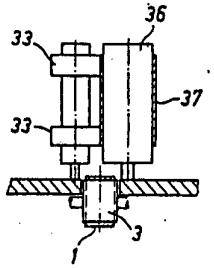

Fig. 6

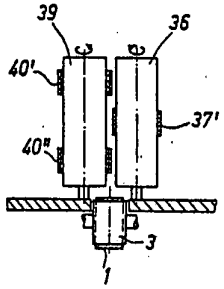

Fig. 8